IS 5960-3 (1970): Methods of test for meat and meat products, Part 3: Determination of total fat content [FAD 18: Slaughter House and Meat Industry]

BLANK PAGE

IS : 5960 (Part III) - 1970
(Reaffirmed 2005)

Indian Standard

METHODS OF TEST FOR MEAT AND MEAT PRODUCTS

PART III DETERMINATION OF TOTAL FAT CONTENT

(Second Reprint OCTOBER 1983)

UDC 637.5:543.851.2

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2

March 1971

Indian Standard

METHODS OF TEST FOR MEAT AND MEAT PRODUCTS

PART III DETERMINATION OF TOTAL FAT CONTENT

Meat and Meat Products Sectional Committee, AFDC 18

Chairman	*Representing*
DR C. M. SINGH	Indian Veterinary Research Institute, Izatnagar (UP)
Members	
DR K. BAGCHI	Ministry of Health, Family Planning, Works, Housing & Urban Development
SHRI D. S. CHADHA (*Alternate*)	
SHRI R. K. BALBIR	State Trading Corporation of India Limited, New Delhi
MAJ A. C. VERMA (*Alternate*)	
DR S. K. BARAT	Central Leather Research Institute (CSIR), Madras
DR S. DIVAKARAN (*Alternate*)	
SHRI S. K. BEDEKAR	Directorate of Marketing & Inspection (Ministry of Food, Agriculture, Community Development & Co-operation), Faridabad
SHRI R. A. BHOTE (*Alternate*)	
SHRI B. S. BHATIA	Defence Food Research Laboratory, Mysore
SHRI S. B. KADKOL (*Alternate*)	
BRIG BRIJ CHANDRA	Directorate of Remounts & Veterinary Services, Army Headquarters
MAJ H. S. DHINSA (*Alternate*)	
CHAIRMAN, TECHNICAL STANDARDIZATION COMMITTEE (FOODSTUFFS)	Ministry of Food, Agriculture, Community Development & Co-operation (Department of Food)
SECRETARY, TSC (F) (*Alternate*)	
DIRECTOR	Directorate of Animal Husbandry, Government of Uttar Pradesh
SHRI R. N. GOYLE	Essex Farms Private Limited, Delhi
SHRI R. N. GUPTA	Continental Exports, New Delhi
SHRI C. P. HARTMAN	Central Committee for Food Standards (Ministry of Health, Family Planning, Works, Housing & Urban Development)
SHRI D. S. CHADHA (*Alternate*)	
HEALTH OFFICER	Corporation of Madras
VETERINARY OFFICER (*Alternate*)	
HEALTH OFFICER	Municipal Corporation of Delhi
SUPERINTENDENT, SLAUGHTER HOUSE (*Alternate*)	

(*Continued on page* 2)

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI

(*Continued from page* 1)

Members	*Representing*
JOINT COMMISSIONER (LIVESTOCK PRODUCTION)	Ministry of Food, Agriculture, Community Development & Co-operation (Department of Agriculture)
DR N. L. LAHIRY	Central Food Technological Research Institute (CSIR), Mysore
SHRI G. S. LITTLEJOHN SHRI K. C. DE' (*Alternate*)	Metal Box Co of India Limited, Calcutta
SHRI S. RAMASWAMY	Directorate General of Technical Development (Ministry of Industrial Development & Internal Trade)
DR M. RANGANATHAN	Madras Veterinary College, Madras
SHRI M. RAO	Gutex India, Calcutta
COL R. R. RAO LT-COL O. P. KAPUR (*Alternate*)	Quartermaster General's Branch, Army Headquarters
SHRI P. M. SANKARAN DR T. R. SHARMA (*Alternate*)	Accelerated Freeze Drying Factory, Tundla
SHRI B. P. VARMA SHRI K. S. BISHT (*Alternate*)	Central Dairy Farm, Aligarh
DR HARI BHAGWAN, Deputy Director (Agri & Food)	Director General, ISI (*Ex-officio Member*)

Secretary

SHRI MANOHAR T. SANTWANI
Assistant Director (Agri & Food), ISI

Indian Standard

METHODS OF TEST FOR MEAT AND MEAT PRODUCTS

PART III DETERMINATION OF TOTAL FAT CONTENT

0. FOREWORD

0.1 This Indian Standard (Part III) was adopted by the Indian Standards Institution on 30 December 1970, after the draft finalized by the Meat and Meat Products Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Investigations at the Defence Food Research Laboratory, Mysore, and Central Food Technological Research Institute, Mysore, have revealed that the methods of test finalized by the Meat and Meat Products Subcommittee of the Agricultural Food Products Technical Committee of the International Organization for Standardization (ISO/TC 34/SC 6) are more precise. It was, therefore, felt by Committee responsible for preparation of this standard that the adoption of these methods would improve Indian Standard methods of test from the viewpoint of better repeatability and reproducibility and would make analytical results more dependable and comparable, specially at the international level. It is expected that these methods will help in achieving uniformity in methods of testing meat and meat products, thereby facilitating interpretation and comparison of results.

0.3 This standard covers only those methods of test which have been finalized by ISO/TC 34/SC 6. At present these relate to the following parts of this standard:

Part I	Determination of nitrogen content
Part II	Determination of ash
Part III	Determination of total fat content
Part IV	Determination of free fat content
Part V	Determination of moisture content
Part VI	Determination of chloride content

0.4 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard (Part III) prescribes the method for the determination of the total fat content of meat and meat products.

2. PRINCIPLE

2.1 Boiling of the test portion with dilute hydrochloric acid to free the occluded and bound lipid fractions, filtration of the resulting mass, drying of the fat retained on the filter and extraction with *n*-hexane or light petroleum.

3. APPARATUS

3.1 Analytical Balance

3.2 Continuous or Semi-continuous Extraction Apparatus — Soxhlet type with an extraction flask of about 150 ml.

3.3 Clock Glass or Petri Dish — diameter not less than 8 cm.

3.4 Conical Flask — 300 ml.

3.5 Cotton Wool — defatted.

3.6 Desiccator — containing an efficient desiccant.

3.7 Electrically Heated Drying Oven — adjusted to operate at 103 $\pm$ 2°C.

3.8 Electrically Heated Sand-Bath or Water-Bath or Similar Suitable Apparatus

3.9 Extraction Thimble — made of filter paper and defatted.

3.10 Meat Mincer — laboratory size, fitted with a plate with holes of diameter not exceeding 4 mm.

4. REAGENTS

4.1 Blue Litmus Paper

4.2 Boiling Chips

4.3 Hydrochloric Acid — approximately 4 N solution; dilute 100 ml of concentrated hydrochloric acid (sp gr 1·19) with 200 ml of water and mix.

4.4 *n*-Hexane or, Alternatively, Light Petroleum — distilling between 40 and 60°C, and having a bromine value less than 1. For either solvent, the residue on complete evaporation should not exceed 0·002 g/100 ml.

5. PROCEDURE

5.1 Preparation of Sample — Proceed from a representative sample of at least 200 g. Render the sample uniform by passing it at least twice through the meat mincer and mixing. Keep it in a completely filled air-tight container and store it in such a way that deterioration and change in composition are prevented. Analyze the sample as soon as possible, but in any case within 24 hours.

5.2 Weigh 3 to 5 g of the minced sample to the nearest 0·001 g into the 300-ml conical flask. Dry the flask of the extraction apparatus, provided with some boiling chips, for one hour at 103 ± 2°C in the drying oven, allow the flask to cool to room temperature in the desiccator and weigh to the nearest 0·001 g.

5.3 Add to the test portion 50 ml of the hydrochloric acid and cover the conical flask with a clock glass. Heat the conical flask on an asbestos wire gauze by means of a gas burner until the contents begin to boil. Continue boiling with a small flame for one hour and shake occasionally. Add 150 ml of hot water. Moisten a fluted filter paper held in a glass funnel with water and pour the hot contents from the flask on to the filter. Wash the flask and the clock glass thoroughly three times with hot water and dry in the oven. Wash the filter with hot water until the washings do not affect the colour of the blue litmus paper. Put the filter paper on the clock glass or Petri dish and dry for 1 hour in the oven at 103 ± 2°C. Allow to cool. Roll up the filter paper and insert it into the extraction thimble. Remove any traces of fat from the clock glass or Petri dish, using cotton wool moistened with the extraction solvent, and also transfer the cotton wool to the thimble. Place the thimble in the extraction apparatus. The paper should be handled either with tongs that can be rinsed or with paper cover slips on the fingers. Pour the extraction solvent into the dried flask of the extraction apparatus. Wash the inside of the conical flask used for the disintegration with hydrochloric acid, and the covering clock glass, with a portion of the extraction solvent and add it to the extraction flask. The total solvent quantity should be one-and-a-half to two times the capacity of the extraction tube of the apparatus. Fit the flask to the extraction apparatus. Heat the extraction flask for 4 hours on the heated sand-bath or water-bath. After extraction, take the flask containing the liquid from the extraction apparatus and distill off the solvent using the heated sand-bath or water-bath. Evaporate the last traces of the solvent on the water-bath, using air blowing, if desired. Dry the extraction flask for 1 hour in the drying oven at 103 ± 2°C and, after allowing to cool to the room temperature in the desiccator, weigh to the nearest 0·001 g. Repeat this process until the results of two successive weighings do not differ by more than 0·1 percent of the sample weighed. Verify the completion of the extraction by taking a second extraction flask and extracting for a further period of 1 hour with a fresh portion of the solvent. The increase in

weight should not exceed 0·1 percent of the weight of the sample. Carry out two determinations on the same prepared sample.

6. CALCULATION

6.1 The total fat content of the sample, percent by weight, is equal to:

$$100 \times \frac{W_2 - W_1}{W_0}$$

where

W_2 = weight, in g, of the flask with the dried fat;

W_1 = weight, in g, of the empty extraction flask with boiling chips; and

W_0 = weight, in g, of the test portion.

Take the result as the average of the two determinations.

6.2 The difference between the results of two determinations carried out simultaneously or in rapid succession by the same analyst should not be greater than 0·5 g of total fat per 100 g of sample.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 1 kg. 1 m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones : 26 60 21, 27 01 31 **Telegrams : Manaksanstha**

Regional Offices:		Telephone
Western : Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
Eastern : 5 Chowringhee Approach	CALCUTTA 700072	23-08 02
Southern : C. I. T. Campus, Adyar	MADRAS 600020	41 24 42
Branch Offices:		
'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	2 76 49
Gangotri Complex, Bhadbhada Road, T.T. Nagar	BHOPAL 462003	6 27 16
22E Kalpana Area	BHUBANESHWAR 751014	5 36 27
Ahimsa Bldg, SCO 82-83, Sector 17C	CHANDIGARH 160017	2 83 20
5-8-56C L. N. Gupta Marg	HYDERABAD 500001	22 10 83
D-277 Todarmal Marg, Banipark	JAIPUR 302006	6 98 32
117/418 B Sarvodaya Nagar	KANPUR 208005	8 12 72
Patliputra Industrial Estate	PATNA 800013	6 28 08
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27